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Abstract

Preterm birth rates are on the increase in almost all countries. Midwives are therefore likely to encounter women who are at risk of, or who go on to have a preterm birth or late miscarriage. This article looks at the known causes and risk factors of preterm birth. It then explains the different predictive tests and interventions that may be used in women who are at high risk of having a preterm birth and late miscarriage. This will enable the reader to have a broad overview on how to identify, correctly refer to other specialists, care for and manage women in this growing field.

Introduction

Preterm birth is defined as delivery before 37 completed weeks of pregnancy and a late or second trimester miscarriage happens after 14 weeks' gestation but before 24 weeks' of pregnancy (Tommy's, 2016). Early birth can be associated with complications, and it is the leading cause of death in children under 5 years of age worldwide (WHO, 2016). In the United Kingdom (UK), 7.8% of babies born were born prematurely in the year 2010, and rates are on the increase in almost all countries (WHO, 2012).

The mechanisms leading to late miscarriage or spontaneous preterm birth (SPTB) are multifactorial and only partially understood. Many research studies are currently being undertaken to investigate causes and methods to identify, treat and prevent early birth (WHO, 2016).

In UK maternity services preterm surveillance clinics are emerging to assess asymptomatic high risk pregnant women (Min *et al.*, 2016). However practices and guidelines vary between Trusts (Sharp & Alfrevic, 2014). This article aims to give a brief summary of current common practice. Midwives are pivotal in ensuring high risk women are offered timely obstetric referral and closer surveillance if they are aware of potential causes.

What are the known causes?

- **Infection**- this can cause inflammation which may trigger labour
- **Progesterone imbalance**
- **Over distended uterus**
- **Cervical insufficiency**
- **Placental pathology** (Ross et al, 2016)

Multiple risk factors can occur making it even more difficult to predict which women will be affected and present with threatened preterm labour.

What are the risk factors?

The above causes are closely linked with risk factors which Midwives are well placed to identify as part of the initial booking visit and subsequent antenatal care. As always, a thorough review of a woman's obstetric and medical history will highlight those who require additional care. A previous SPTB or late miscarriage carry the highest rate of recurrence therefore these women will benefit from an early obstetric assessment.

Risk factors that should be considered for referral:

- **Previous SPTB or late miscarriage**
- **Previous cervical surgery**-e.g. LLETZ or cone biopsy because some cervix has been removed
- **Multiple pregnancy** – due to over distention
- **Uterine abnormality**- e.g. Bicornuate, unicornuate, uterine septum or uterus didelphus
- **Previous caesarean section at full dilatation**- this may disrupt the integrity of the cervix in future pregnancies (Carter *et al.*, 2014)

Lifestyle and social factors can also increase the likelihood of women having a SPTB or late miscarriage, for example domestic violence and use of tobacco or recreational drugs (Dahlin *et al.*, 2016).

Case-loading care would be beneficial to women who may have lifestyle or social factors. A Cochrane review suggested that women who receive midwife-led continuity models of care are less likely to have a preterm delivery (Sandall *et al.*, 2016). In Trusts where case-loading is an option, you may want to refer a woman at high-risk of preterm delivery to them.

What surveillance can inform women and clinicians about the risk of SPTB?

Cervical length measured by trans-vaginal ultrasound scan (TVS) between 14 and 24 weeks of gestation is a sensitive predictor of preterm birth (Grimes-Dennis & Berghella, 2007). NICE (2015) guidelines suggest a cervical length of less than 25mm requires intervention between 16 and 24 weeks of gestation. This is to reduce the risk of a late miscarriage or preterm birth. Regular surveillance of the cervical length enables clinicians to monitor changes and offer intervention at the appropriate time if required.

Predictive tests are performed using vaginal swabs and tested at the bedside, and can be undertaken alone or in conjunction with cervical length measurements. They include Actim® Partus, Fetal Fibronectin and Partosure™ (Table 1).

Table 1 Predictive Tests

<u>Name of Test</u>	<u>Overview</u>
Actim® Partus	<ul style="list-style-type: none"> • Gives a positive or negative result • A positive result means the woman may deliver in the next 7 days
Fetal Fibronectin (fFn)	<ul style="list-style-type: none"> • Can give a qualitative (pos/neg) result or quantitative (numeric, range of 0->500ng/l) • Contraindications include vaginal bleeding, sexual intercourse within 48 hours, and ruptured membranes as these can give false positives
Partosure™	<ul style="list-style-type: none"> • Gives a positive or negative result • Can be used when membranes have ruptured • A positive test result indicates that delivery is likely to occur within 7 days

These tests, alongside cervical length measurements, can aid clinicians' decision making. A new app, called 'QUIPP' is also available for both symptomatic and non-symptomatic women based on their risk factors, cervical length and fFn. This app can provide an individual likelihood of SPTB or late miscarriage (Kuhrt *et al.*, 2016; Watson *et al.*, 2017).

Image 1: QUIPP app in use

Symptomatic

1. SYMPTOMS SUGGESTIVE OF ABNORMAL OR PREMATURE UTERINE ACTIVITY?
☒ Yes ☐ No

2. PREVIOUS CERVICAL SURGERY?
☐ Yes ☒ No

3. PREVIOUS PRETERM BIRTH $\leq 36^{+6}$?
☒ Yes ☐ No

4. PREVIOUS PPROM?
☐ Yes ☒ No

5. NUMBER OF FETUSES
 Please select 2

6. GESTATION OF TEST
 Weeks 26 Days 0

7. SHORTEST CERVICAL LENGTH (MM) fFN RESULT (N/ML)
 20 300

calculate **Reset**

Back Risk of sPTB

Probability of spontaneous delivery

Before 30 weeks	37.5%	>
Before 34 weeks	70.7%	>
Before 37 weeks	95.9%	>
Within 1 week	8.6%	27 + 0/7 >
Within 2 weeks	18.0%	28 + 0/7 >
Within 4 weeks	37.5%	30 + 0/7 >

New Episode

Symptomatic Asymptomatic Information

What interventions can help?

Cervical cerclage (or stitch) is a suture placed around the cervix. The theory is that the stitch provides mechanical support, in addition to creating a barrier against ascending infection. Sutures can be placed vaginally or abdominally. NICE (2015) guidelines recommend offering a cerclage to women with a history of SPTB between 16 and 34 weeks and have a cervical length <25mm on TVS.

Vaginal cerclage

Different types include:

- low cervical cerclage (McDonald's)
- high vaginal cerclage (Shirodkar) - in which requires displacement of the bladder during insertion
- rescue cerclage- this may be used in instances of premature dilation of the cervix and bulging membranes.

Abdominal cerclage

A transabdominal cervical cerclage (TAC), involves a surgical procedure into the abdominal cavity and may be an option in women where a vaginal cervical suture has failed. It is also used in cases where a vaginal suture is impossible or technically difficult, for example due to minimal cervical length from cervical surgery.

A recent multi-centre trial of vaginal versus abdominal sutures in women with a previous failed vaginal cerclage reported that TAC had better outcomes in reducing late miscarriage and SPB than vaginal sutures (Carter *et al.*, 2015). Women with previously failed cervical cerclage may therefore benefit from early or pre-pregnancy referral to a specialist for this treatment.

Non-surgical treatments

- Progesterone

Progesterone therapy has been a longstanding intervention in the prevention of SPTB. NICE (2015) guidelines suggest offering prophylactic vaginal progesterone as an option for women at increased risk with a cervical length <25mm.

- Arabin Pessary

This is a silicone ring which encircles the cervix to alter the weight distribution and the angle of the cervix. The pessary can be inserted and removed (at around 36 weeks) in an outpatient clinic without the need for admission.

- Current research

Current research is being undertaken to evaluate the most effective intervention for the prevention of preterm birth. The Support study is a multi-centred randomised controlled trial of the cervical suture vs. the Arabin Pessary vs. vaginal progesterone. The STOPPIT-2 trial is also looking at using the Arabin Pessary in twin pregnancies.

Interventions used in threatened preterm labour (TPTL)

Over 90% of women who attend with symptoms of TPTL do not go on to deliver in the next 2 weeks (Peaceman *et al.*, 1997), however Midwives are often the first to assess a woman and an understanding of the pathways aids timely decision making.

Antenatal Corticosteroids (ACS) are known to enhance fetal lung maturation and reduce the occurrence of respiratory distress syndrome in neonates, particularly when administered within 48 hours prior to birth. However, repeated courses of steroids have been associated with a reduction in mean birth weight (Crowther *et al.*, 2015) and potentially adverse mental health in childhood (Khalife *et al.*, 2013); therefore the timeframe for administration is imperative.

Obstetricians may offer women antenatal admission to provide close proximity to neonatal services and aid bedrest. Although there is currently no evidence for or against the benefits of bedrest (Sosa *et al.*, 2015), decisions should be made on an individual basis with the woman considering medical and social factors.

Tocolytic therapy aims to suppress uterine contractions, and therefore may be used in order to gain time for an ACS course or in-utero transfer.

Magnesium Sulfate is given by IV infusion antenatally for the neuroprotection of preterm babies (NICE, 2015). When caring for a woman on magnesium sulfate, monitor for signs of magnesium toxicity at a minimum of every four hours.

In the event of a SPTB or late miscarriage

Women who have a SPTB or late miscarriage are more likely to develop postnatal depression (Tahirkheli *et al.*, 2014). Midwives have a crucial role in aiding mothers and their families through this difficult and stressful time.

The following things may be helpful (Redshaw *et al.*, 2014).

- Communication – e.g., debrief
- Family centred – ensuring partners are included in discussions
- Continuity
- Practical support – e.g., preparing parents for the NICU environment, feeding a preterm baby, flexibility with postnatal visits with a baby in NICU
- Bereavement support – if required
- Pre-conception care for future pregnancies

Conclusion

Appropriate surveillance and treatment reduces the rate of late miscarriage and SPTB and provides extra reassurance to women who are often anxious. It also reduces hospital admissions, which in turn reduces risks to women of venous thromboembolism (VTE), eases the impact on the family, as well as reducing cost to the NHS.

Midwives therefore have a key role in supporting women at risk of a preterm birth with early referrals, appropriate clinical care and emotional support for the woman and her family. The impact of holistic woman centered care is invaluable alongside a sound clinical knowledge base in this population.

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